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Reply to the comment on the paper “Grain size dependent potential for self generation of magnetic anomalies on Mars via thermoremanent magnetic acquisition and magnetic interaction of hematite and magnetite” by Gunther Kletetschka, Norman F. Ness, J.E.P. Connerney, M.H. Acuna, P.J. Wasilewski, Phys. Earth Planet. Inter. 148 (2005) 149–156, made by: Jafar Arkani-Hamed

Arkani-Hamed (2003) objects to the description of his thermoremanent magnetization model that appears in our paper (Kletetschka et al., 2005). The author (Arkani-Hamed, 2003) writes in his abstract:

“In all models considered the primary magnetization is 20–30 A/m and has the dominant contribution to the observed magnetic anomalies.”

Unfortunately, this number appears only in the abstract. Throughout the rest of the paper, there is no clear statement regarding how this number came about. We refer the reader to Arkani-Hamed’s (2003) paper for an explanation of his model. However, we note that the observations themselves cannot be used to uniquely determine crustal magnetizations. Any estimate of magnetization intensity in the crust requires assumptions or constrains regarding the distribution of magnetization, depth of magnetization, and so on. The magnetization is even more biased considering that Arkani-Hamed’s (2003) model fits artificially-generated data generated by magnetic 50-degree model (Arkani-Hamed, 2001) that was fitted to another model (Purucker et al., 2000) where a global distribution of radial (Br) magnetic field observations (Acuña et al., 1999) and associated uncertainties is inverted for an

equivalent source magnetization distribution and then used to generate an altitude-normalized map of Br at 200 km.

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